

The Economic and Environmental Benefits of Reducing Methane Emissions

If you purchased an appliance or bought a home lately, you may have noticed a star-shaped decal or may have been told that your purchase was "Energy STAR compliant." This means that your appliance or home meets the energy efficiency specifications of the Environmental Protection Agency's (EPA) Energy STAR program. The EPA's STAR program has another division called Natural Gas STAR in which ExxonMobil is a partner.

The Natural Gas STAR program is a voluntary initiative with both economic and environmental benefits that seeks to reduce emissions of the greenhouse gas methane. The program was initiated over ten years ago and is currently a key component of President Bush's climate change policy. The American Petroleum Institute (API) has recently committed to 100% member participation in the program; other majors such as Shell, ChevronTexaco, BP, and ConocoPhillips are also partners in the program.

Before the merger of Exxon and Mobil, both companies were involved with the Natural Gas STAR program. Post-merger, there also are ongoing opportunities to benefit from involvement in the program. A few of the primary ways ExxonMobil U.S. Production (USP) currently receives methane reduction recognition through this program are through voluntary installation of vapor recovery units, artificial lift technology, and flares.

Although compressor-driven vapor recovery units are one of the most common methods USP uses to reduce methane emissions, they are often not ideal due to their sizing restrictions and maintenance requirements which result in downtime. Vapor recovery technology involves the gases that are vented during storage of crude oil. These vented gases; methane, natural gas liquids and sometimes-hazardous air pollutants, collect in tanks and often are released into the atmosphere. The traditional method of vapor recovery is through the use of the compressor-driven unit, however, a new technology has proven promising. The new technology, Environmental Vapor Recovery Units (EVRUs), is installed to capture these gases and use high-pressure motive gas to entrain hydrocarbon vapors emanating from the condensate storage tanks. The combined discharge gas stream exits at an intermediate pressure, which can be used onsite as fuel, or re-pressurized with a booster compressor and injected into a natural gas transmission line for sale. This closed loop system is designed to reduce or eliminate emissions of greenhouse gases (methane and carbon dioxide), hazardous air pollutants (HAP's) and other constituents present in vent gas.

The most important benefits of the EVRU system include its simple operation and high reliability. The unit is flexible and can be designed to handle varying volumes of vent gas and can be used to recover or boost the pressure of gas from storage tanks, cold vents, glycol dehydrators, heater-treaters and flares. EVRUs have a minimal spatial design that can be skid mounted or installed in a pipe rack, and have no maintenance and no moving parts, which means there is nothing to wear out or be replaced, no oil changes and no electric motors to rewire or clutches to rebuild. Additionally, the EVRU requires no

outside electrical power or fuel to operate, and has 100 percent runtime with no emissions.

The ExxonMobil Mariposa Compressor Station site in South Texas has recently installed this new EVRU technology. The system was installed to capture tank vapors that were being vented to the atmosphere. The project was initiated because of both emission-related issues and revenue losses. The economics of this installation show close to \$11,000 a year savings in operating expenses over the traditional compressor-driven vapor recovery unit. The Capacity Enhancement Team has monitored progress with this first installation and recognizes the opportunities and advantages this technology offers.

Another method USP is voluntarily utilizing to reduce methane emissions is the installation of artificial lift systems in gas wells. ExxonMobil operates several thousand low-pressure gas wells that are difficult to produce on a 24-hour basis. Periodically, many of these wells need to be vented into the atmosphere for a short period of time to resume their production. To reduce the emission of gases and increase production, USP has installed artificial lifts in these gas wells. Plunger lift, down-hole soap injection and rod pumps are the three main types of artificial lifts USP uses, and each type keeps the well running continuously with no venting necessary. This technology simultaneously contains the methane emissions and increases the flow of natural gas, and has a very positive economic and environmental impact.

The installation of flares is also a way USP is voluntarily reducing methane emissions. Low-pressure natural gas and vapors are emitted from storage tanks and other equipment into the atmosphere and USP has installed flares at many sites to combust these methane emissions instead of venting them.

There are many opportunities USP will be evaluating for future methods of reducing methane including installation of electric compressors, piping of dehydrator emissions to VRU or flare, further artificial lift installations, shutdown or consolidation of equipment, and the installation of flash tank separators on dehydrators. The replacement of gas-driven pneumatics with low or no-bleed pneumatics may have significant potential depending on how many gas-driven pneumatics are currently in use. For example, one USP field has realized a gas savings of 40,000 kcf/yr with less than a two year pay out at \$2/kcf by implementing this reduction opportunity.

Everyone within USP is strongly encouraged to look for methane emission reduction opportunities in their area and to bring them to the attention of their respective Air Subject Matter Expert. Neil Ryan, a USP regulatory compliance supervisor, is very positive about U.S. Production's future involvement with this program. "We see a tremendous advantage to capturing the economic and environmental benefits of reducing methane emissions. This voluntary program provides organizations such as USP an opportunity to take credit for our positive steps toward emission reduction. We should take advantage of every opportunity to promote cost effective emission reduction opportunities and communicate them through the Natural Gas STAR program," he said.